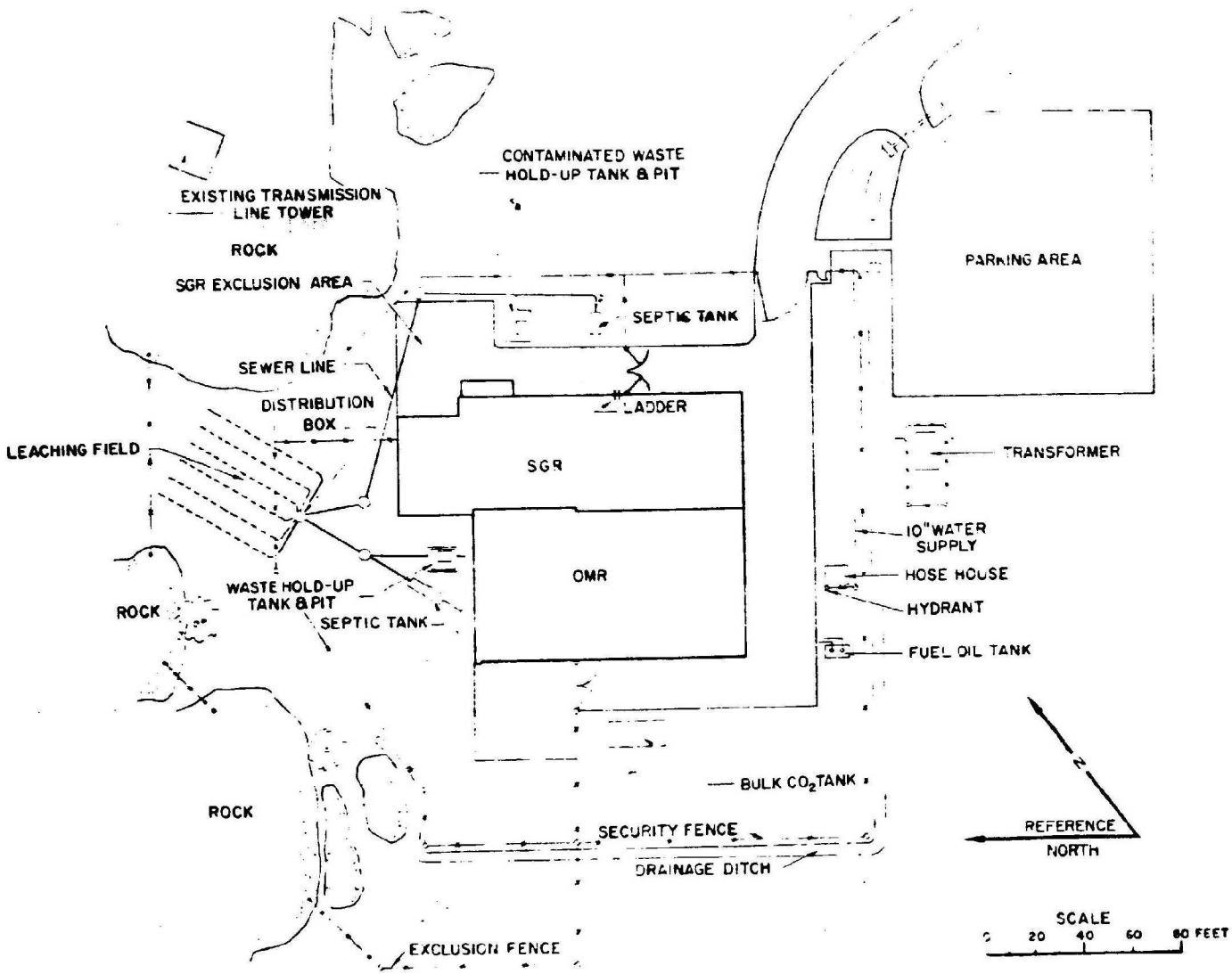

Figure 9. Plot Plan of Al Critical Experiment Facility

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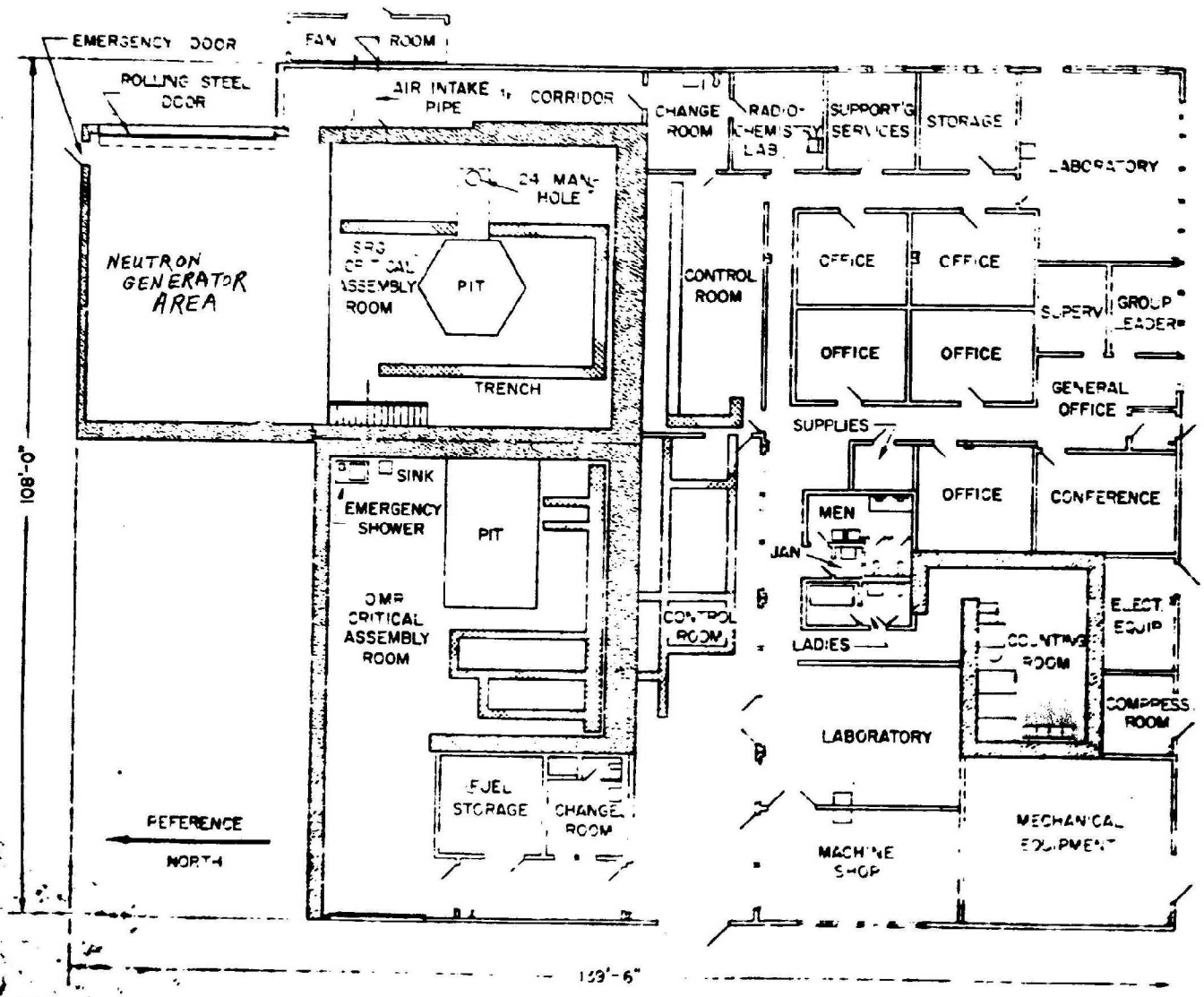

Figure 10. Floor Plan of AI Critical Experiment Facility

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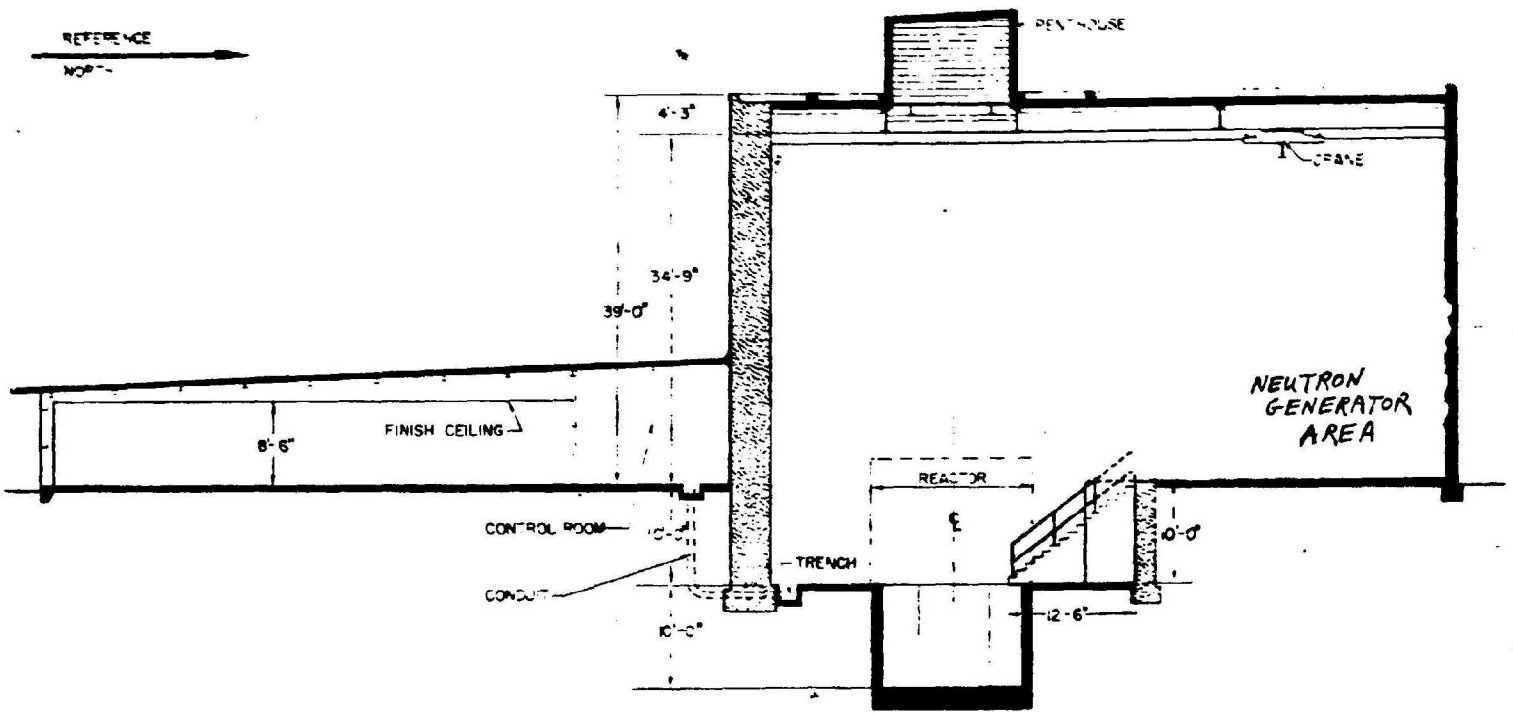

Figure 11. Elevation Through SGR Critical Facility (looking west)

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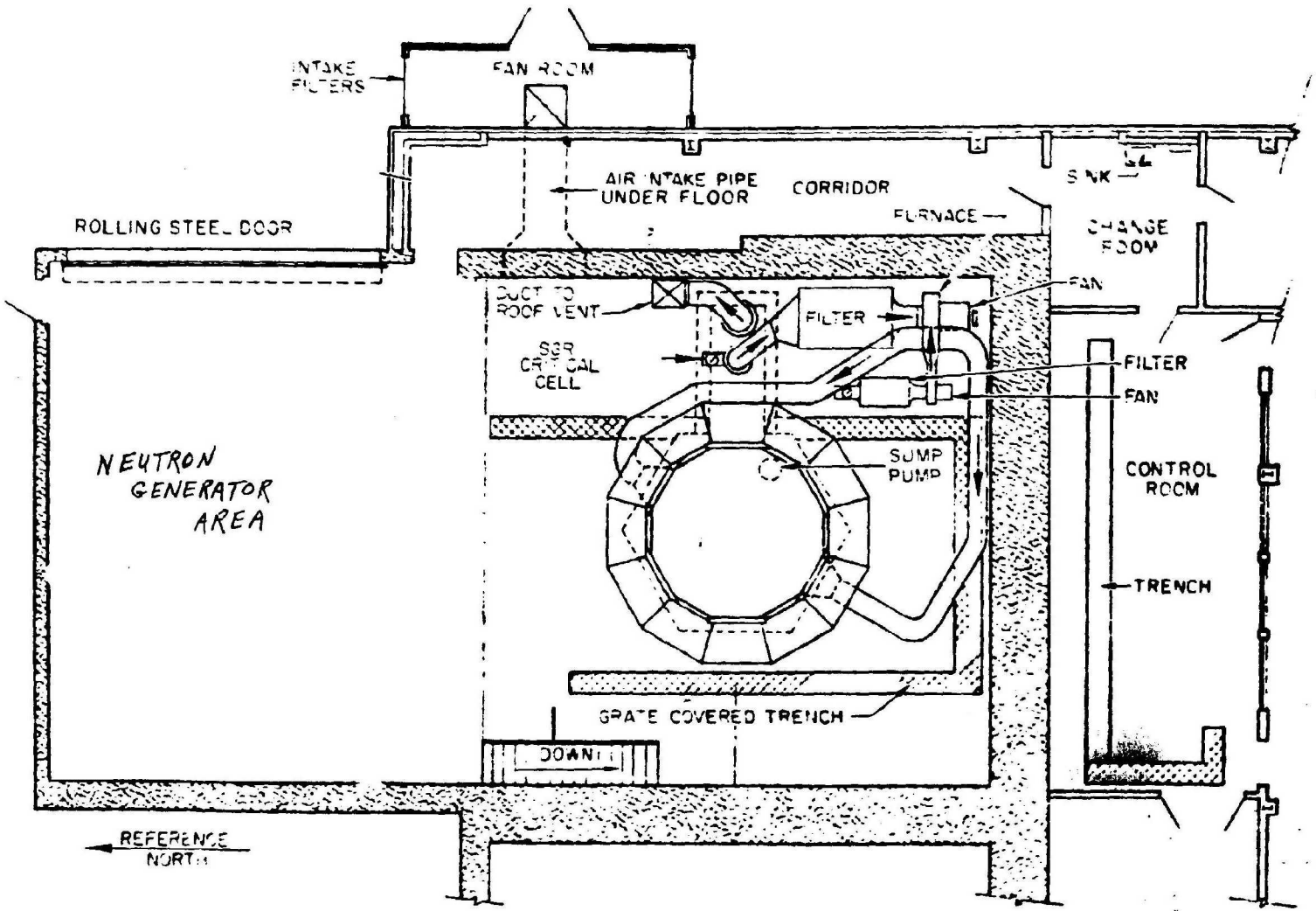

Figure 12. Plan View of SGR Critical Assembly Room

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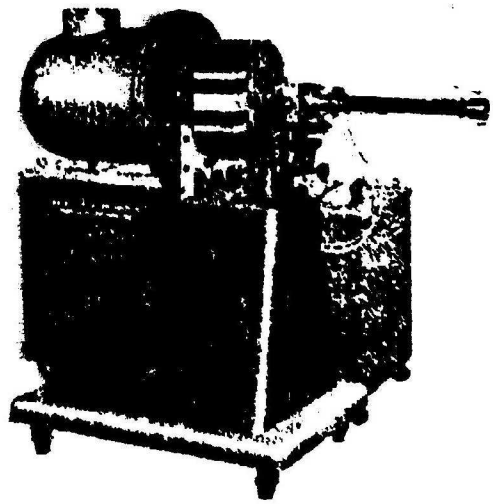
ACTIVATRON 211
NEUTRON GENERATOR
2.5 X 10^{11} NEUTRONS/SECOND YIELD

- BEAM CURRENT STABILITY BETTER THAN 3% PER HOUR
- REACHES RATED YIELD WITHIN 30 SECONDS AFTER COLD START
- INSTANTANEOUS ON/OFF CONTROL OF NEUTRON PRODUCTION
- LONG-LIVED PENNING ION SOURCE
- NO EXPOSED HIGH VOLTAGE
- OIL COOLED AND INSULATED
- LESS THAN 22 MINUTES DOWNTIME FOR TARGET CHANGE



A VERSATILE, HIGH-YIELD NEUTRON GENERATOR FOR DEMANDING ACTIVATION ANALYSES . . . AVAILABLE WITH BOLT-ON ACCESSORY EQUIPMENT FOR SOPHISTICATED PULSED NEUTRON EXPERIMENTS

ACTIVATRON 211 is the first neutron generator in its price range capable of producing 14 Mev neutrons at a rate of over 2.5 x 10^{11} n./sec. This high yield — combined with exceptional beam stability — contributes to a significant improvement in the speed, accuracy, and sensitivity obtainable through activation analysis techniques.

Although the ACTIVATRON 211 was designed primarily for advanced research applications, its moderate cost and ease of operation also qualify it for educational or industrial use. Unrestricted operating flexibility is achieved through the use of a dual power sputter ion pump, a variable-focus beam, and separately adjustable power supplies for the main accelerator, ion source, and focusing sections. Personnel safety is assured by electrical interlock provisions and the absence of exposed high voltage. The use of transformer oil for high voltage insulation and ion source cooling eliminates corrosion, arcing and corona discharges while contributing to the stability and life of the ion source. The modified Penning ion source employed is an all-metal unit with a virtually unlimited operating life.

The ACTIVATRON 211 consists of an accelerator unit, associated high voltage supplies, and a desk-type control console. To form a complete system for activation analysis, these basic elements can be furnished with an automatic sample transfer system, scintillation detectors, a multi-channel pulse analyzer, flux monitors, and readout equipment — all designed and built by TMC.

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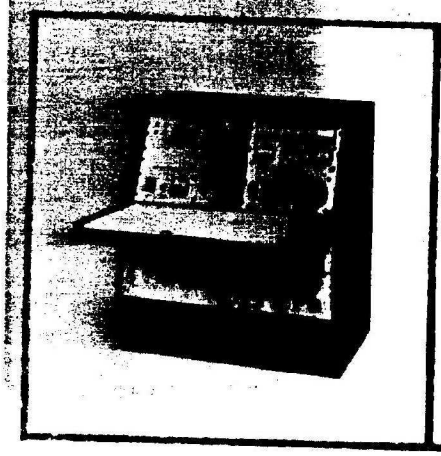
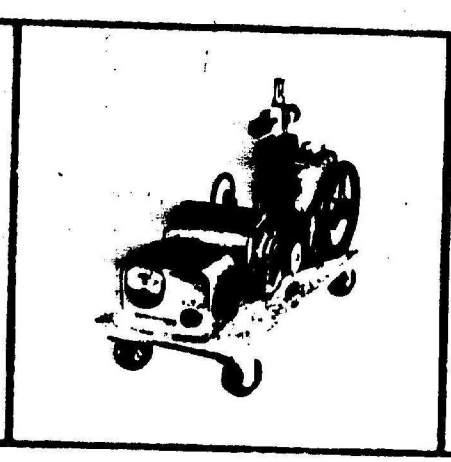
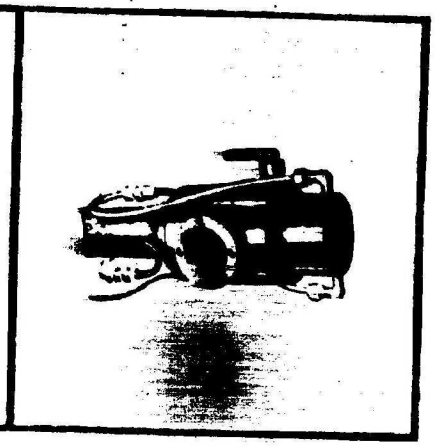


All operating controls for ACTIVATRON 211 or for a complete TMC activation analysis system are mounted in a single desk-type console.



Model 170 Roughing Pump and Gauge Assembly (described below) is one of the optional accessories available with the ACTIVATRON 211.



Model 189 Quartz Flap Assembly, an optional attachment, allows operator to observe beam position and focus before starting an analysis.

SPECIFICATIONS

TYPICAL YIELD
2.5×10^{11} neutrons/sec. (14 Mev).

TYPICAL NEUTRON FLUX
4×10^{10} neutrons/cm²/sec. at back surface of target holder.

THERMAL NEUTRON FLUX
2.5×10^{9} neutrons/cm²/sec., when target is inserted in a moderator assembly.

ION SOURCE
All-metal, modified Penning type.*

POWER SUPPLIES
Main supply: 0 to 200 Kv DC, 0 to 5 ma., positive polarity.
Ion source supply: 0 to +15 Kv DC, 100 ma., floating at main supply potential, positive polarity.
Focusing supply: 0 to −15 Kv DC, 10 ma., floating at main power supply potential, negative polarity.

BEAM CURRENT
2.5 ma.

BEAM FOCUS
Adjustable from ¼" to 1" diameter at target.

REMOTE CONTROLS
Vacuum functions, beam energy, beam focus, and beam current are remotely controlled and metered. Target cooling and target secondary electron suppression are remotely controlled.

VACUUM PUMP
Dual-power sputter ion pump with 200 liter/sec. capacity. Vacuum valves provided for isolating, venting, and roughing target section.

ULTIMATE VACUUM
10^{-7} mm. Hg range.

OPERATING VACUUM
10^{-6} mm. Hg range.

GAS SUPPLY
25 liter (STP) deuterium bottle, located at ground potential. May be mounted either on generator or control console.

COOLING
Integral water recirculating system for target cooling. No external water connections required.

SAFETY
No exposed high voltage. Safety interlocks provided.

PHYSICAL DIMENSIONS
Accelerator Unit: 70 in. L x 28 in. W x 61 in. H.
Desk Type Control Cabinet: 46 in. W x 43 in. D x 51 in. H.
High Voltage Power Supply: 30 in. L x 30 in. W x 36 in. H.
Variable Focus Power Supply: 22 in. L x 22 in. W x 27 in. H.

WEIGHT
Accelerator Unit: 650 lbs. (less oil).
Desk Type Control Cabinet: 350 lbs.
High Voltage Power Supply: 250 lbs. (less oil).
Variable Focusing Power Supply: 175 lbs. (less oil).

POWER REQUIREMENTS
High Voltage: 230 volts, 60 cps, single phase, 25 amperes.
Vacuum Pump: 230 volts, 60 cps, single phase, 25 amperes.

ACCESSORIES

MODEL 170
ROUGHING PUMP AND GAUGE ASSEMBLY

Specifically designed for use with the ACTIVATRON, this unit consists of a two-stage vacuum pump and thermocouple type gauge, mounted on an aluminum base with rubber-covered swivel casters. All necessary tubing and valves are furnished to permit direct connection to the ACTIVATRON. The pump may be used for initial pump down before starting the ion pump, for evacuation of the target section after changing the target, and also for maintaining a vacuum on the gas supply system during shutdown.

MODEL 178
DEUTERIUM GAS
25 liter STP flask
Patent applied for.

MODEL 189
QUARTZ FLAP

This attachment permits visual inspection of beam location and diameter during test periods when hydrogen ions are accelerated. Quartz fluoresces when struck by charged particles at low beam currents, and incandesces at high beam currents. Flap may be rotated into beam for inspection purposes, or rotated out of beam for beam current measurement and operation.

MODEL 177
TARGET

4 C/in.² titanium tritide target, 1¼ in. diameter, 0.010 in. copper backed.

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